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THE STATUS OF *CIROLANA PARVA* HANSEN, 1890 (CRUSTACEA, ISOPODA, CIROLANIDAE) WITH NOTES ON ITS DISTRIBUTION

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Abstract.—The type-material of *Cirolana parva* Hansen is redescribed, and the distribution of the species reassessed. *Cirolana parva* is reliably known only from the Caribbean Sea and the Gulf of Mexico; most non-Caribbean records are probably erroneous. *Cirolana diminuta* Menzies, 1962 is accepted as a valid species.

Hansen (1890) in his monograph of the Cirolanidae described and figured *Cirolana parva*. All but one of his specimens originated from the West Indies. The species was later recorded from the Caribbean area (Richardson 1900, 1921; Moore 1901; Menzies and Glynn 1968) and also throughout the Indo-Pacific and the East Pacific. The only areas from which the species has never been recorded are the coasts of South America and Europe.

In examining cirolanids from Australian coasts it became apparent that there were some inconsistencies amongst specimens being identified as *C. parva* (Bruce 1980a, 1980b) and *Cirolana cranchii australiense* Hale 1925 (Holdich et al. 1981). Detailed study of specimens from selected localities eventually led to the conclusion that what has been considered *Cirolana parva* is in fact a complex of over a dozen sibling species, at least 8 of which occur in Australia. It was found to be necessary to examine the syntypes of *Cirolana parva* to determine convincingly that species' absence from Australia.

Since these species are all so similar to one another we redescribe *Cirolana parva* to prevent further application of that name to the numerous closely related, but distinct species.

Cirolana parva Hansen
Figs. 1, 2

Cirolana parva Hansen, 1890:340, pl. 2, figs. 6–6b, pl. 3, figs. 1–1d.—Richardson, 1900:217; 1905:111, figs. 93–95; 1912:178.—Moore, 1901:167, pl. 8, figs. 6–8.—Menzies & Glynn, 1968:38, fig. 14C–D.

Non *Cirolana parva*.—Stebbing, 1905:12; 1910:217.—Nobili, 1907:421.—Barnard, 1914:353a; 1936:154; 1940:499.—Chilton, 1924:883, fig. 5; 1926:1980.—Boone, 1927:136.—Monod, 1930:fig. 5A, C; 1931:3; 1933:173, fig. 80; 1937:15.—Nierstrasz, 1931:151.—Edmondson, 1951:192, fig. 4a–g.—Menzies & Frankenberg, 1966:51, fig. 27A–C.—Miller, 1968:15, fig 4.—Schultz, 1969:185.—Jones, 1976:216.—Bowman, 1977:653, figs. 1–3.—Hamsa & Nammalwar, 1978:517, figs. 1–11.—Kensley, 1978:69, fig. 289.—Bruce, 1980a:110; 1980b:158.

Material.—Cirolana parva syntypes: 2 ♂ (5.6, 6.9 mm), 3 ♀ (5.1, 5.5, 7.6 mm), St. Thomas, West Indies. ♂ (5.9 mm), ♀ (6.3 mm) 25°N, 34°E. ♀ (7.9 mm,

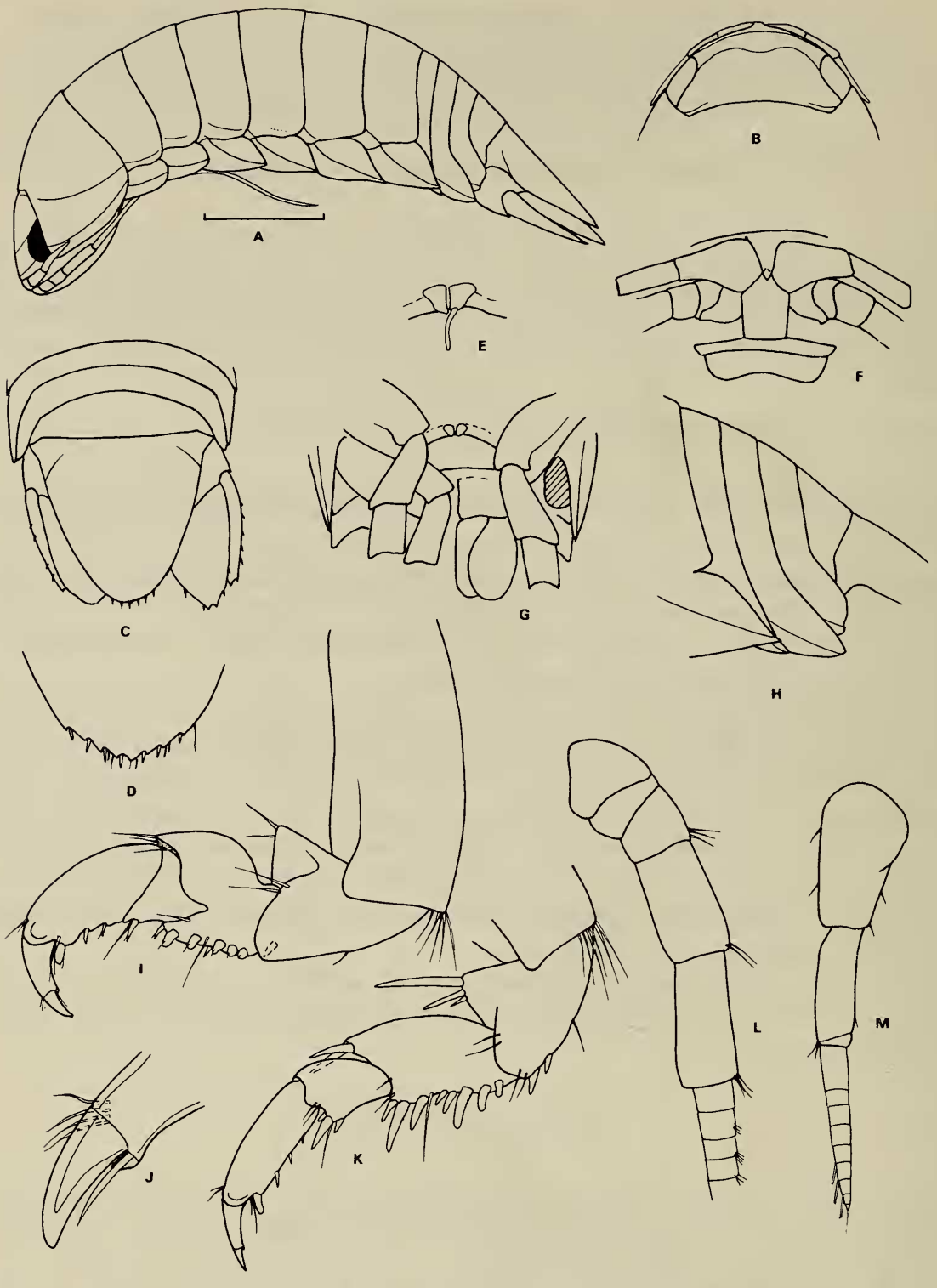

Fig. 1. *Cirolana parva* syntypes: A–D, F, H, 5.3 mm ♂; E, G, 6.3 mm ♂; I–M, 5.5 mm ♀. A, Lateral view; B, Cephalon, dorsal view; C, Pleon and pleotelson; D, Pleotelson, posterior border; E, Peneal processes; F, Clypeal region; G, Sternite 7; H, Pleon, lateral view; I, Pereopod 1; J, Dactyl of pereopod 1; K, Pereopod 2; L, Antennal peduncle; M, Antennule. Scale line represents 1.0 mm.

ovigerous), West Indies. ♂ (6.9 mm), no locality, West Indies. ♀ (5.0 mm) Samoa. 2 specimens (4.4, 5.0 mm), in very poor condition, St. Croix, West Indies. *Cirolana parva* non-types: Specimens from the localities shown in Fig. 4 from the collections of the National Museum of Natural History, Smithsonian Institution. Not *Cirolana parva*: Hundreds of Australian specimens of *Cirolana* spp., spec-

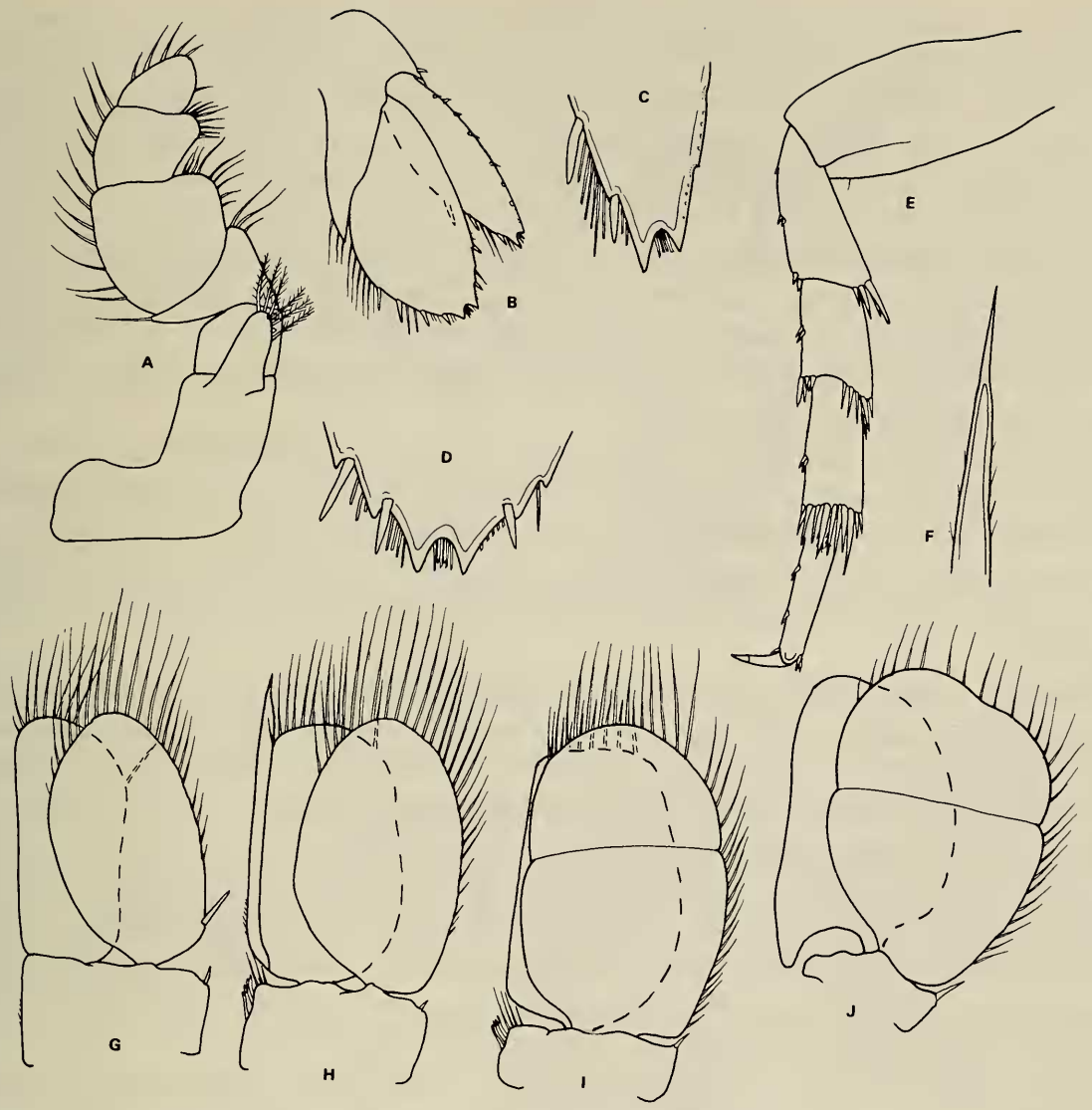

Fig. 2. *Cirolana parva* syntypes: A–D, 5.5 mm ♂; E–J, 6.9 mm ♂. A, Maxilliped; B, Uropod; C, Uropod exopod, apex; D, Uropod endopod, apex; E, Pereopod 7; F, Appendix masculina, apex; G, Pleopod 1; H, Pleopod 2; I, Pleopod 4; J, Pleopod 5.

imens of both sexes of *C. diminuta* Menzies, 1962, from La Jolla, California, and of *C. parva* of Jones (1976).

Type-locality.—Hansen (1890) gave no type-locality, but as one of the St. Thomas specimens has been dissected, it seems apparent that Hansen's description is based on these specimens. St. Thomas is here recognized as the type-locality. The type-specimens are held by the Zoologisk Museum, Copenhagen, Denmark.

Male.—Body about 2¾ times longer than greatest width, surface minutely punctate. Cephalon with rostral process; dorsal surface with anterior interocular carina, and entire faint furrow running between the dorsomedial margin of each eye, medial part of furrow posteriorly deflected; maxillipedal somite indicated by 2 furrows at posterolateral margins. Pereonite 1 with 2 horizontal furrows; pereonites 2–4 each with horizontal furrow, pereonites 5–7 each with oblique furrow; coxae of pereonites 2–7 each with entire furrow; coxae of pereonites 4–7 projecting beyond posterior margins of segments. Pleon with segment 1 largely con-

cealed by pereonite 7; pleonite 2 with posterolateral margins acute; pleonite 3 with posterolateral margins produced and encompassing pleonite 4, superior margin convex; pleonite 4 with superior margin rounded, small projection where horizontal furrow meets margin. Pleotelson with smoothly curving lateral margins; posterior border with 8 spines, each set within slight identation; short plumose setae lie on each side of spines.

Antennule with peduncular articles 1 and 2 fused; peduncular article 3 with fused 4th article present; flagellum extending to pereonite 1, composed of 9 articles, first of which is longest. Antenna with peduncular articles 1–3 short, peduncular articles 4 and 5 long, subequal in length; flagellum composed of about 26 articles, extending to pereonite 6.

Frontal lamina pentagonal, lateral margins straight, slightly divergent, anterior margins concave; apex overlapped by downward projection of rostral process. Clypeus narrow. The fragility of the specimens did not allow a full dissection of the mouthparts, but they appear similar to those of other members of the genus (sensu strictu, Bruce 1981). Maxilliped with 2 coupling hooks and 6 plumose setae on endite.

Pereopod 1 with setae at posterodistal angle of basis; ischium with single spine at posterodistal angle and 2 setae at superior anterodistal angle; merus with posterior margin slightly sinuate, provided with 5 robust and 2 acute spines; carpus with single seta and acute spine at posterodistal angle; propodus with 2 spines on palm, and third stout spine opposing the biunguiculate dactyl. Pereopods 2 and 3 similar, less robust than pereopod 1 with merus, carpus and propodus proportionally longer, and with more numerous and larger spines. Pereopods 4–7 progressively longer. Pereopod 7 with virtually no setae, groups of spines at anterior distal angle of ischium, and propodus with 2 groups of spines, merus and carpus with one; distal angles of propodus each with 2 spines.

Penes present on sternite 7; short, triangular, projecting posteriorly, set close together.

Pleopod 1 endopod with slightly concave lateral margin, broadest at ⅓ of its length from apex. Pleopod 2 with appendix masculina arising basally, extending beyond endopod by $^1/_5$ its length, apex narrows rapidly to an acute slender point. Exopods of pleopods 3–5 with entire transverse suture. Endopod of pleopod 3 with about 13 setae, pleopod 4 with about 9. Peduncles of pleopods 2–4 each with 4 coupling hooks.

Uropods projecting slightly beyond apex of pleotelson. Exopod slightly shorter than endopod, lateral margin with 7 spines and short plumose marginal setae, medial margin with 3 spines; apex bifid with medial process more prominent than lateral. Endopod with 2 spines and sensory seta on lateral margin; medial margin with 4 spines amongst plumose marginal setae; apex bifid.

Female.—Differs from the male only in the sexual characters.

Color.—Pale tan in alcohol. Chromatophores bleached out. Related species show a variety of chromatophore patterns (pers. obs.).

Size.—Syntypes range from 5.6–6.9 mm for the males, and 5.0–7.6 mm for females.

Variation.—The dorsal cephalic furrow is not always easy to observe and the indentation of the posterolateral margin of pleonite 4 is only present in the type-

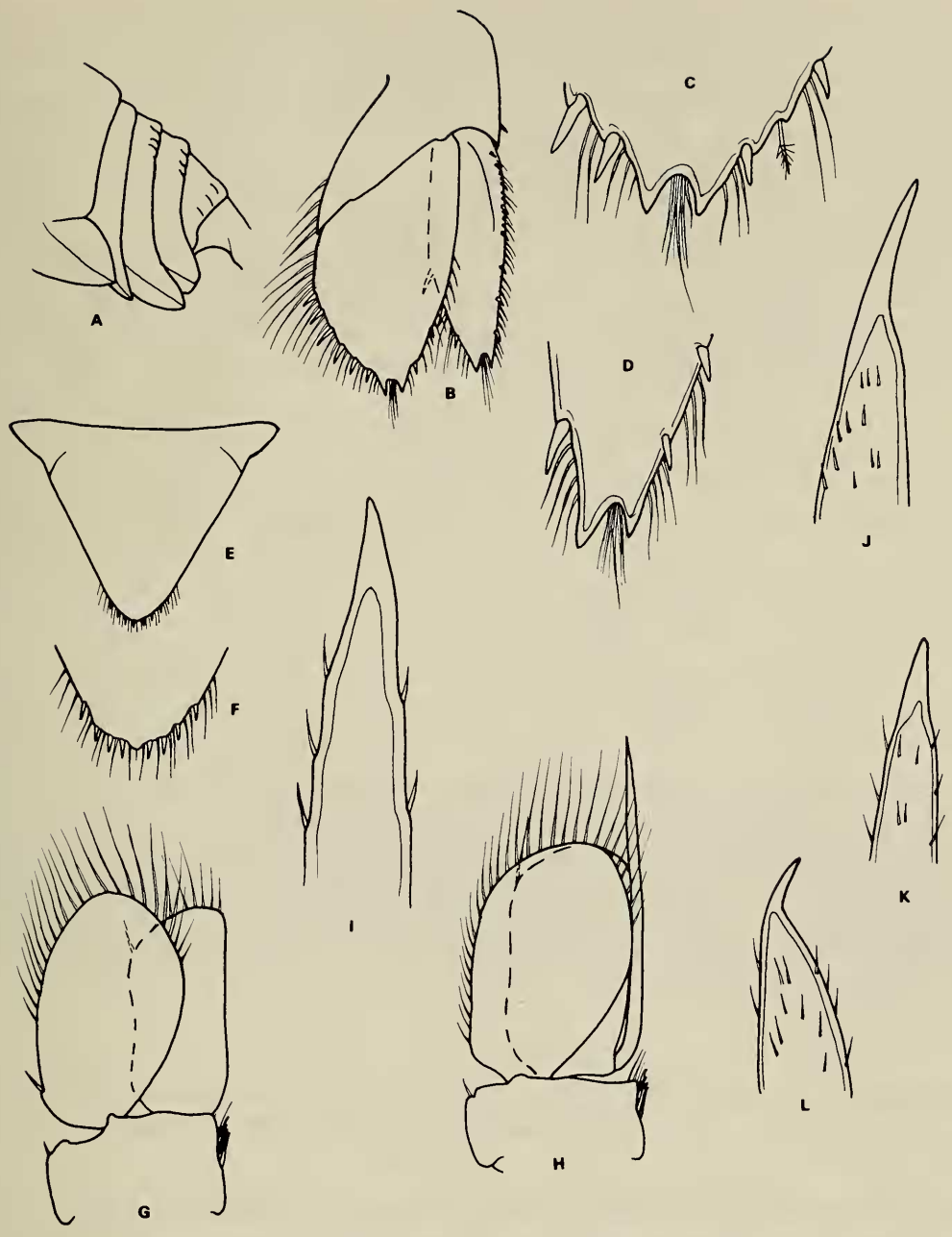

Fig. 3. *Cirolana diminuta*: A–I, 6.3 mm ♂; La Jolla, California. A, Pleon, lateral view; B, Uropods; C, Uropod endopod, apex; D, Uropod exopod, apex; E, Pleotelson, dorsal view; F, Pleotelson, apex; G, Pleopod 1; H, Pleopod 2; I, Appendix masculina, apex. *Cirolana parva,* appendix masculina, apices: J, Montego Bay, Jamaica; K, Quintana Roo, Mexico; L, No Name Key, Florida.

specimens. The apex of the appendix masculina varies slightly as shown in Fig. 3.

The spination of the pleotelson and uropods, position of the penes, and morphology of pleopods 1 and 2 are constant throughout the specimens examined.

Remarks.—The characters that most readily separate *C. parva* from other similar species are the cephalic furrowing, the spination and shape of the pleotelson and uropods, the shape of the endopod of pleopod 1, the morphology of the appendix masculina, the shape and position of the penes, the shape of the lateral margins of the pleonites and the form of the uropod apices. *Cirolana diminuta*

Fig. 4. Known distribution of *Cirolana parva,* confirmed from syntypes and from other specimens in the National Museum of Natural History, Smithsonian Institution. 1, St. Thomas; 2, St. Croix; 3, San Juan, Puerto Rico; 4, La Parguera, Puerto Rico; 5, Northwestern Cuba; 6, Florida Keys, Florida; 7, Dry Tortugas, Florida; 8, South of Apalachicola, Florida; 9, Montego Bay, Jamaica; 10, Espiritu Santo Bay, Quintana Roo, Mexico.

can be separated by the differences in the characters figured here (Fig. 3A–L) and also by having the vasa deferentia opening flush with the surface of sternite 7.

Distribution.—Reliable records exist only for the Caribbean and the Gulf of Mexico. These are reviewed by Richardson (1905). Menzies and Frankenberg (1966) record the species from Georgia but figure the uropod with 6 spines on the medial margin of the endopod, and as the appendix masculina is not quite the same, this record needs confirmation before it can be accepted. All other records are either without figures and cannot be confirmed without reference to the specimens, or can be refuted by reference to the figures given (Monod 1930; 1933; 1976), or by reference to specimens (*C. parva* of Jones 1976, *C. diminuta* Menzies, *C. parva* of Bruce 1980a, b).

The specimen labelled as from "Samoa" appears identical to all the other syntypes, and it is likely that the locality is in error, a possibility considered by Hansen (1890).

Discussion

In his revision of the family Cirolanidae, Hansen (1890) described *Cirolana parva,* the description being accompanied by excellent figures. Several subsequent records (Richardson 1900, 1912; Moore 1901) were from the Caribbean, the

source of the original specimens. Shortly after the turn of the century reports were published from further afield, from Ceylon (Stebbing 1905), the Red Sea (Stebbing 1910), Polynesia (Nobili 1907) and southeastern Africa (Barnard 1914). Although none of these early reports gave figures, they apparently led to general acceptance that *Cirolana parva* is cosmopolitan in distribution. This acceptance was reinforced by numerous subsequent records and by 1980 the species had been recorded from Kenya (Jones 1976), West Africa (Monod 1931), Thailand (Chilton 1924, 1926), Hawaii (Edmondson 1951; Miller 1968), Indonesia (Nierstrasz 1931), Cocos Island in the East Pacific (Bowman 1977) and Australia (Bruce 1980a, 1980b). The synonymization of *Cirolana diminuta* extended the range to include the western coast of the United States.

In examining "*Cirolana parva*" from Australia, there appeared to be a great deal of variation present in samples from one locality and from different localities. In some series the males had a dense fringe of setae along the inferior margins of the first pereopod articles. Specimens with this character could not satisfactorily be identified as *Cirolana parva,* yet neither could they be identified as *Cirolana cranchii australiense* (see Bruce & Ellis (1982) for discussion of this species). This prompted the detailed study of all Australian specimens available, and eventually 8 species were determined. These different species are primarily separated by differences in details of the pleon, pleopods 1 and 2, uropod and pleotelson morphology and spination, setation of the male first pereopod, position of the vasa deferentia, and articulation and proportional length of the antennule articles. In general the antenna, mouthparts, pereonal morphology and pereopod morphology were found ineffective in separating species.

Comparison of the syntypes with specimens recorded by Bruce (1980a) which include two species, and by Bruce (1980b), and to other unrecorded material reveals that *Cirolana parva* does not occur in Australia. Similarly, Kenyan specimens proved not to be *C. parva*. The record of Hamsa & Nammalwar (1978) is of a species related to *Natatolana woodjonesi* (Hale, 1925), and Monod's (1933) record, one of the few with figures, is also not *C. parva*.

One further species needs discussion, *Cirolana diminuta,* from California. Menzies and Glynn (1968) concluded that the differences shown by *C. diminuta* were insufficient to keep it separate from *C. parva*. Specimens from La Jolla identified as *C. parva* show several differences from *C. parva* (see Fig. 3), and the shape of the pleotelson readily identifies them as adult *C. diminuta*.

A further complication in dealing with the taxonomy of *Cirolana parva* resulted from confusion as to whether or not the species was distinct from *C. cranchii* Leach. This idea was initiated by Stebbing (1917), and supported by Nordenstam (1946). Monod (1976) contributed to the argument, and concluded that although the 2 species were not separable, they were not necessarily conspecific. Bruce and Ellis (1982) have shown that the 2 species are abundantly distinct, as in fact can be seen from Hansen's (1890) figures.

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